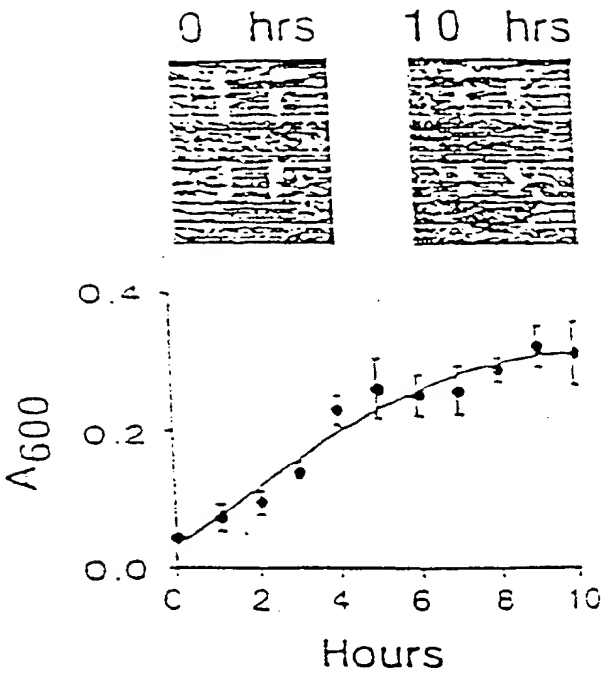


FIG. 1

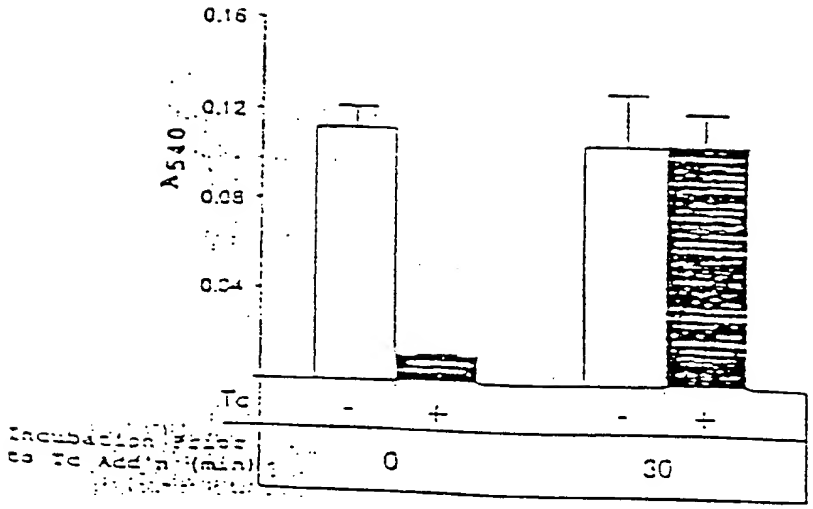


FIG. 2

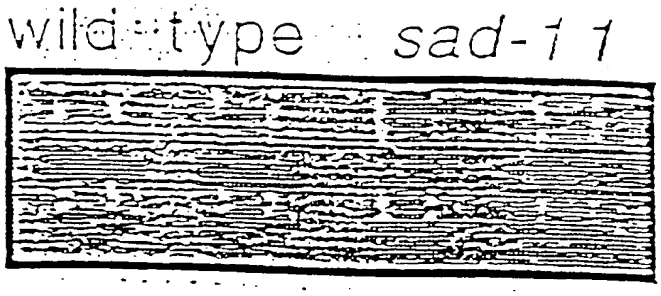
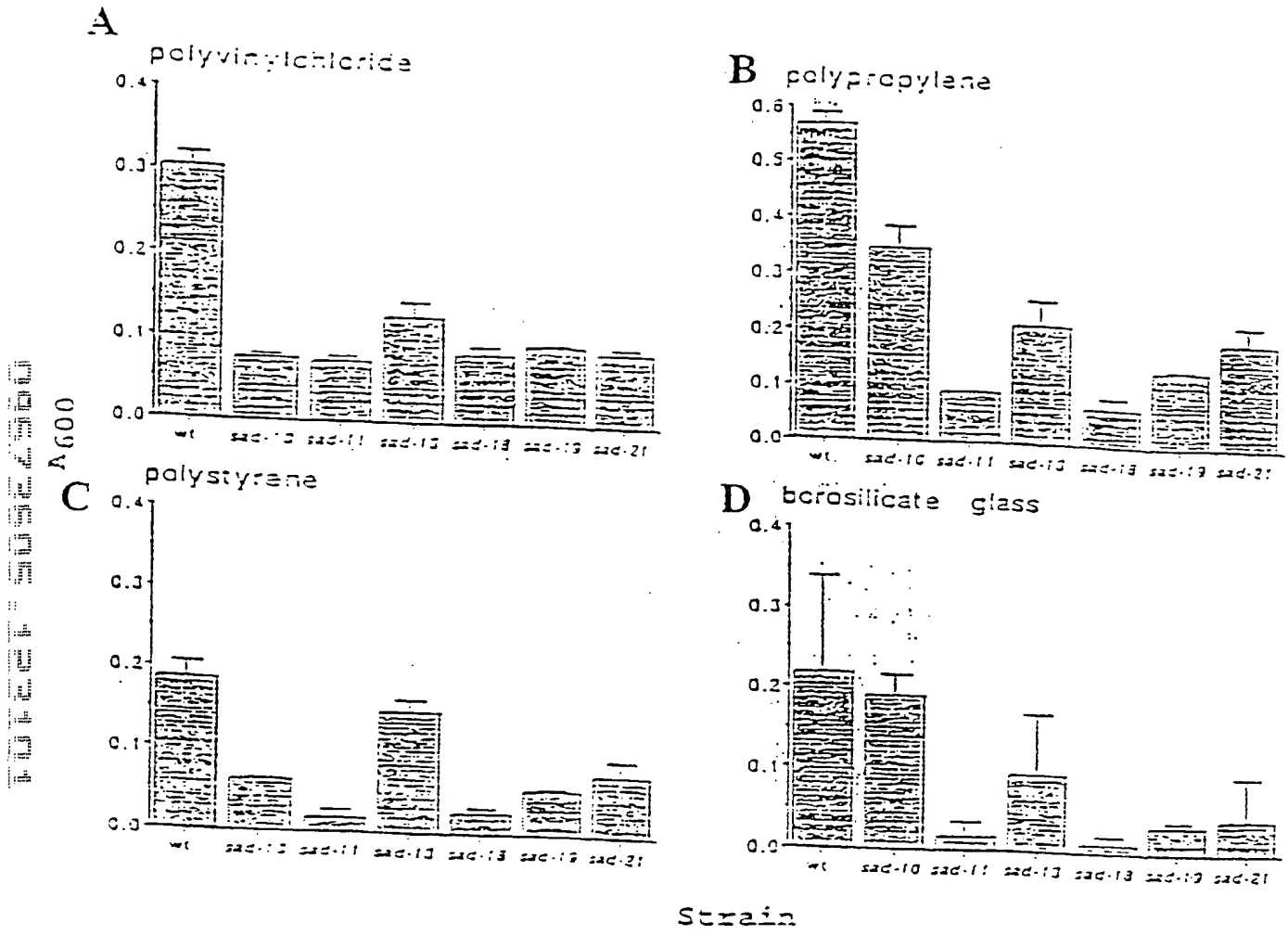


FIG. 3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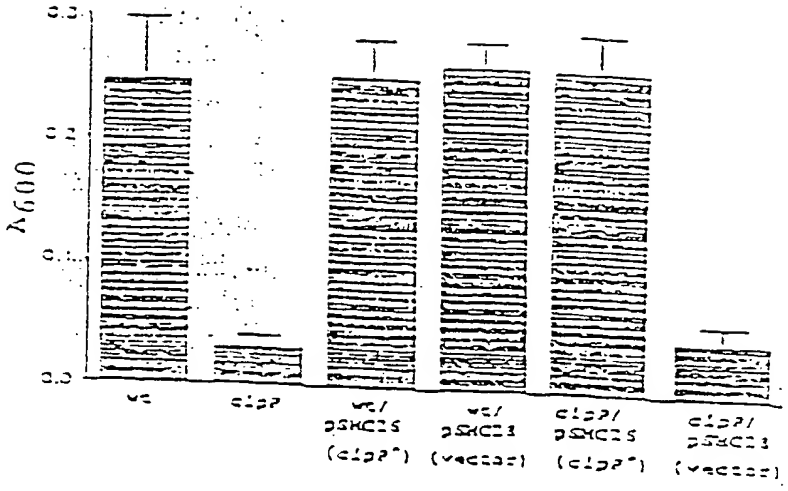
B
polypropylene
C
polystyrene
D
borosilicate glass
A_{600}
wt
sad-10
sad-11
sad-13
sad-18
sad-19
sad-21
Strain

Fig. 4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0.2
0.1
0.0
A600
vc
clpP
vc/ pSKC15 (clpP+)
vc/ pSKC13 (vector)
clpP/ pSKC15 (clpP+)
clpP/ pSKC13 (vector)

Fig. 5

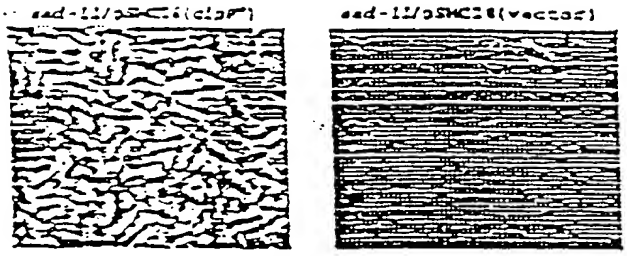


Fig. 6

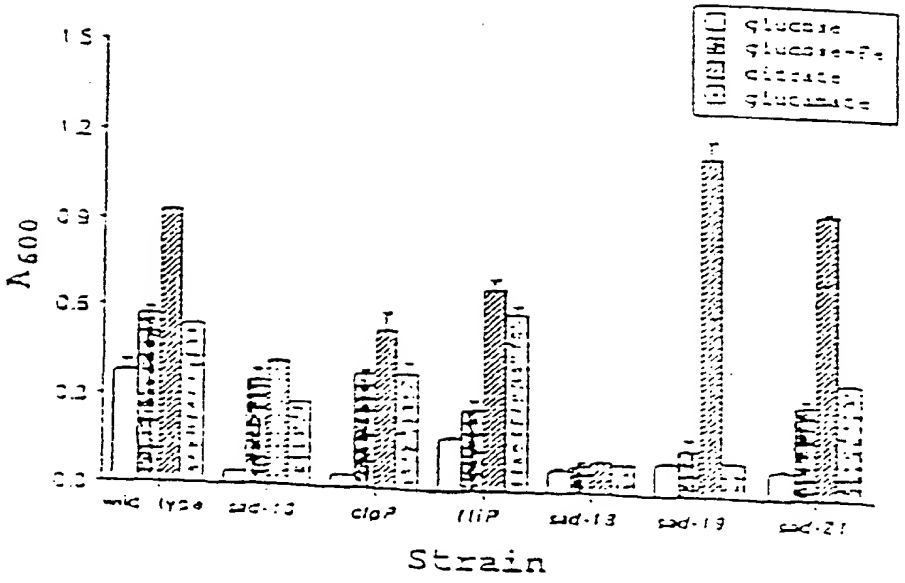
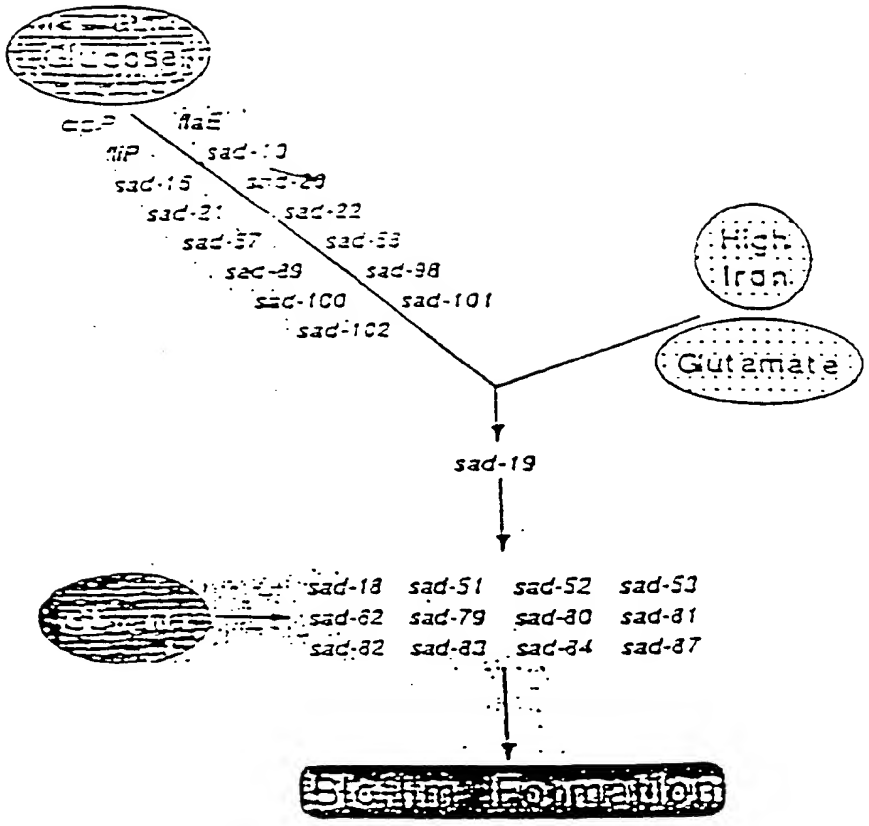


Fig. 7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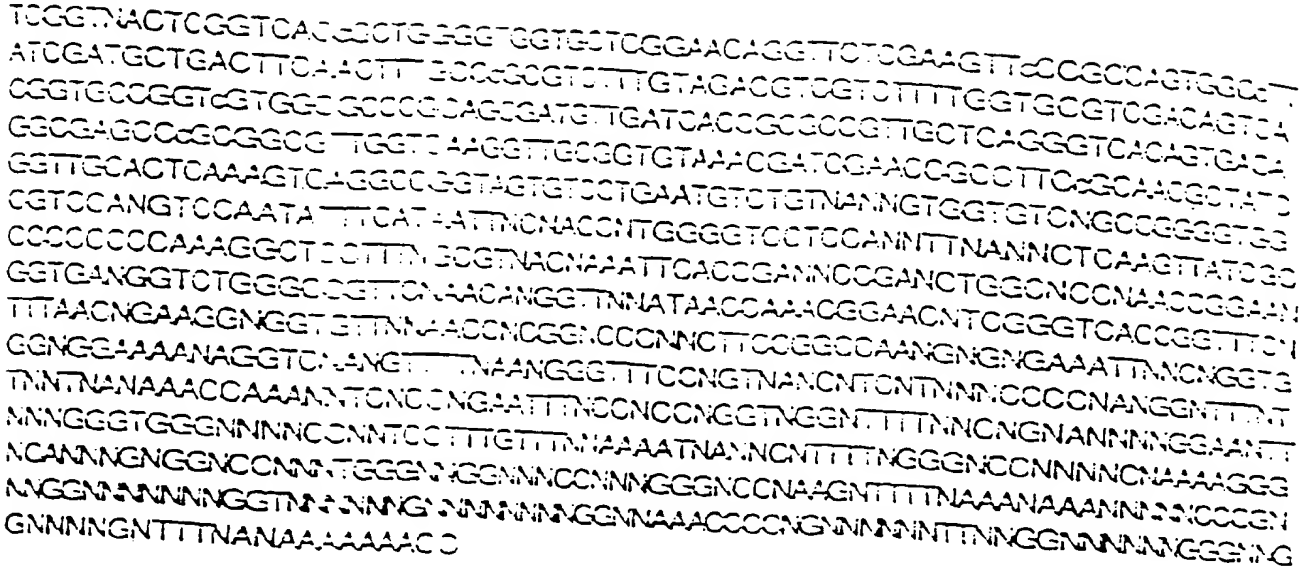
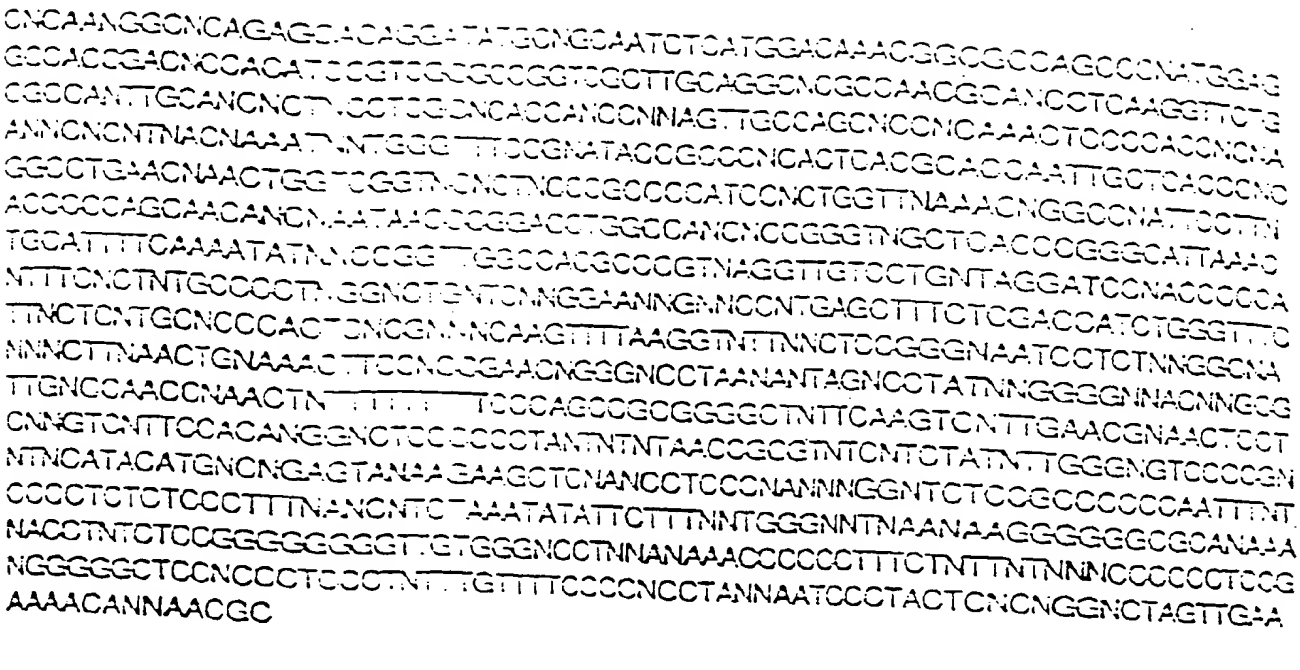
sad-15
sad-21
sad-22
sad-57
sad-58
sad-98
sad-100
sad-101
sad-102
High Iron
Glutamate
sad-19
sad-18
sad-51
sad-52
sad-53
sad-62
sad-79
sad-80
sad-81
sad-82
sad-83
sad-84
sad-87
Stem Formation

Fig. 8

SEQ ID NO: 4



SEQ ID NO: 5



scd-21 SEQ ID NO: 7

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TGGCCGGTTACAACCCTGCGCTGGTCNAACGCAACCCCAAAGGCCTGCCCNA
ACAATGTGCCAGCNAATGGGTACGGCCGATCACCCCCCTGGACCTGCCCNA
TTGACCCGCCCGGCTGTTCGTGGAAGGGGGCCGTCGGCCAGTTCGCCNANGCCC
TGGCCGGCGCGCAACCGCCCCAGGCNACCGCACTCGCCGGGCACCCCGGTCAC
CGGTTTCGCGCCCGCCGCAACCCGGCAGCAGCNTTTTGCCCTGAAACGCGGC
AACAATGCNTTGGGCCATCGGCANCNAACGCTCGTTCAATGGCCCGTTNGGAA
TNTTTGCTTGCAAACCCCCCATTTTTCCCGTTGGGTTAGGCGGCATTCCTTTTC
TNACCANAAAGCACCTGAACCATTCCCCGGCAANCTTGGAAATTCTTGGCCCC
CNGNGCCTGCCAATTTTGCCNAAAAATCAANATCGGTTTCAACCANCCNCCTT
GCCTGGAACCAAACCGTCAAAAACTCCAAAAAAAATTCCCCCTTNCCNCTTGCAA
TCNNTCNAAGAACCAACCCTTTTTTTNCCAAGGNATTTTTTTTCCNANAAACNNC
AAANGTNTTTNNAATTTTACNACTTAAGGCCANTTNNAAAGTNCCCAATTTTT
TANNGTCCAATTTGNCCCNATTTTAAAGGCTCCGGTT

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Fig. 9

>sad-10 SEQ ID NO: 1

GACCGCAGNAGAGGAACNGNCGGAGGANCAGGAAGGACGAGAGNGGAAG
AAGGGGGGAAGGGGAGGGGGGAAGGAGACNCCGACNNGGGGGNATNNG
GGANNNGGGNGGGGNGNGGNNNTGNTTATNATNANGCTCCGGCCCGGACGAA
GAAATTCCGATGCA TGCTCGAGGCGTAGGCCTGTCTCGGGACAAGGTCA
ACCACGTATTCAGCAAAGTGCTCNAGGCGGAANTGCTGCTGCGCGAACTGGC
CTCGCANTTCAGCCAGGGCTGAATAGGCTCGCCCGGTCATTTGATCTTTCCCAC
GCTCTGCGTGCGAATGCATCCCGTGACGCTCTGCGTCACATCTCAGAAGCGGA
ACGCGGAGCGTCCCTGGCGACNTTCCGNGNCAGGGAGCGTGGCGAACCNANCA
AACNTGGTCCCCTCGATTNTAAAGTTCTTCCTTAAAANCTTCTTNCGGGCTT
CCAGGGTATTTTGGTCCANCCCCTTGGGAACCCANATCCCCCAGGCGCCCCGG
GGTTGCCCCNTTTGATCCTGGGGATTCCGACTTTGTTCCTTGNAAATCCCCCCT
TCCATTGAAACCNCCCANGTTTNGCCTTTTGTTTCCCTTTGGGCCCNTNCCAA
TCCGNTGNGGCAAAAACGCCCATTANGGGCCNGGGCCGGTCCCCCCCCCCCNCGN
NTGTTACTNAANTNCANACGCCNNTTGGGCCANAAANNTCGNCTNGNGN
NNNNNCNNCGNCNTCTTTNCTNCCCNTCCNNNCTNTNNTCCTCNGTGTATNTC
CAANTCNTNCCNNCGCCCNTCCNGCCTCCCCACTNCCTNNGCCCTCCNNNCCNN
CGCGTTNCATTNCTCCNCCNTNNTCCGCTTNTCCCCNTTTANCGTNGCCGTTNC
CCGCCCGNNNCNNNGTCATCNNTGNCGCTCTTCCNCCNCCCTGTCCNCCCANT
GCCNNGNTNNCTCCGACGTCGCNGGTCTCNCCNCCNCNGNTTCGTGCNCNGGCN
CNNGATCCCGTTCNCNCCNGNCCNTNATGCTGACCAGTNNGNGNGNGTNGNN
NCCTCCCGTCNGNACNTGTNTNGNGGGGGGGCCCNCCC

>sad-11 Match: clpP SEQ ID NO: 2

GGNGGGGNNGGGNCTTGTGTATAAATNTCAGGCTCTGACATCCAGGCCCCAG
GCCGGCCTGGTCCCNATCGTTATCGACCANTCCGCCCCGCGGCNAANGTGCCTAT
NANATCTACTCNCGTCTGCTCAANGAACGCGTCATCTTTCTGGTGGGCCCCGGT
AAAAGACTACATGGCCNACCTGATCTGTGCGCAACTNTTGTTCCTTGAANCC
NAAAACCCCGNACNAGGATATCCATCTCTATATCAACNCCCCNGGTACTAGT
TCAACCCGTGAAAAAA

>sad-16 SEQ ID NO: 3

GCTNGTGTCTACCGNTCAGCAANAATGCCGCCCCGCGACNACAACNCTTAATC
NGCTGAAANTCCATTCGATGATGCTCCACCCGTCCATCCNANCCTGGAAGCC
AGGATTNCTGCCCCGACATNANGGTNCGGGTGGCAACAATCTCACCGNAACCT
GNNCCTGTGGTCACAANCGAGGTTCAGGTCACCACCGNCGTCCCGGCACCGGT
TGCCCCNCTGGTCAGGCCGGGCCAGGCNNCGGTNGCCCCAGANGTCNATCCTCC
CTTTGACCCTNAANCNGACCCGCNCNATGCNTGGCNACCNTTGCNTTTGGCA
ATGGACCNCGCNGGACATNTTNCCGCCCGCTATCCAGGGCNCNACCCAANAN
TACNGCCCCGGCGTCCCTCTANNNTNTACTATTCNACGCGTGGGCANANNTGC
CCCTNGTNGGCTTNCCTTTCTCTTCCCCGNCNCCTNTTTTTCCCCNNNTTTTTTT
GNCGCGNCCCNCTCTCNNTCCCTNCCTTCCNCNNNCCNTCGTCTNNNNCCCTNG
TGGGCCTCNCCCCTTTNTCCTTCCTTCGNGNTTTNCTTCCGTGGCCCTNCTCTCTG

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NTTCGNCNC-GTNGCTTCCGGTTANCCCAGCCTCCGTCTTCCNCCGGCTGNNGCNCT
CTCNTTTCTTGCTTCNTCTTCCCTGTGGCCCTNTGCGATCNCNCNANCTTCTCCT
CGCTNNGGTCNCANCCTTCNGTNTCCCCNNGNGNCGNCNNCCTNCTCTNCGNCC
NNNNTCGTCTTCGTNNNCNNGTNCTNNNNCNNCAGTCNNGTGTNGNNAGNT
TNNCGNAGTNTGNNATCCC

>sad-20 **SEQ ID NO: 6**

NCNNACGNNTNGNAAGTGATCAGGCCNATTAAACNNNTGACNAAAANNAG
AACANGNNCGTCTGTTACTACTCTTCAAGACCAACCCAAGNCGACCGTGNA
TAGCGNGNCCTNTACCCAGCATCNGTTCCNCATTTAGATTNNTATCCATCCN
TAAGTTTCNCCGGGTCAGAACGNTNCTTGACGTACAACCCATANNGCGGGGT
ANNGGGNNATTTTNNGCTACCTCNCATGTTTTGGAAGNCGNANTNCCCNTT
AATNGGNAGCNNCANNCANGCNCNNGGGGATTATTACNACTCNACCCNTGG
ANAACNTTGCCACTACNGCNGGNCCCCCGCNGNGTCNGGNCTCCCCTGCCCAC
TTCCCTTGTCTCCCGNCCTCTNTNCCCCCTTTTCNCGTCNNCTTCTGGTGTNCGN
TTCCCCTCCCCCCNGTCCTCNTTCANCNNCENGCGTCTNCGCCACCTNGNCGNNC
TCTTCCCTNCTGGCCCCTCTNNCCCCCNTTCGTTNTANCCCCTCTCTCNACNTNC
TTCATCCCGTCCCTNTTCTTNCTCTCCNCTCNCCNCCCTNTCCTANTCCTNTCGT
CCCNCTNCGNTCNTCGTCTNCCTNCNCCNCTTNTCGACTTCNNCNTGTTGNCCC
NCCCGCNGNCNCTTCTCTNGTCTTCTCCCGTCNGCNGCTCAGNNCCCNTCCTTCC
NTTNCTNCTNNCTGTCCGNCNGCGNNCCTGTNCCTNCGNCCCCTAGNNNCGNC
GCGCCTCNGCNNCCTCGTCCCNNGNTNTNNTCTTTCTGCNCCGTGCTCNNTNTT
CNTNTNTCNNCTCGCCCATCCNCTNCCTCTNTNNNCGTNGNTTCCNCTTCTA
GGNCCNNATTCCNANNNCNGGCCNTTNCCCC

>sad-22 **SEQ ID NO: 8**

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ATAATGACTTNCCTTTATTAANTGTCCGGACCATNCCATATNCAACCGTCC
ANACCGTNAACTTNACCCANCATGNCTCCGCNTGTCGTATTTATANNCCCCA
TAAGCTTCNCCCGTCAGAACGTTNCAATAGGTACANTNATACTGCNCGCGNC
ATGGCATTTTGGCTTTCTTTATGTTNGGNAGTTCNAACAGCCTTTTTATGGA
GCGTCCACAGCTATAGGGGGAAANTNCTATTCAACNCTGGCNAAAANTTTGA
AAAACTNAGANCTTCNNNGGTNTATAGGGGTATCCCNTGACCAAANNCCN
CTAATTCCNACNCTTTGNTCCCACTTCCTCCCTNGCGCGNCTTTACCNNGNGCC
CCGTCCCTTCCCCNCNGNNCNTNGGNCACNCGCCGAAANGNNNTCNCCCCGTG
GTTTTCTCCCNGTCNTNGNNNNNCCTCGTGNNTCCCGCNNCCTTNCCCCCCNGT
TCGGAACTNTTCTCCCCTNCNCCCNCGCGNGTCGTCTNNNTNNCCCNNGNTNC
NCNGGNTTNCNCNGCCNCCNTTTCCTCCCCCCCCCCTTANCCNGGANCCCTCTC
CCTNCGCNTGGCCNCCCCCCCNGGNCCCTCCCCTNTNCCCTCGGNGNCNCNCGNC
GCNCTCCTTNNCNTTCGCCTCCTCCNNCCNTCNNCTCCNCTCNTNCCNNTCCCNN
CCCTCNTNNNTCCCCCNTGCCCNNNNCNCCGCCNTTCGNTCCTCNNNNNNNTN
CCTGNGCCCGCGTGCNCNGTNCGNCCCGCTNTCCTGCCTGTCNCCCCCCCTNCCC

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Fig. 9

>sad-51 SEQ ID NO: 9

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ACACCAGCACCGTTTCGCTCACAGCGACTTCGACGGTGCCCGAAGGTGGGACT
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ACCCTGTTCCAAACGCCANACCATGNCCATTCCGGTTGGNGCCAGCANCNGC
ACCGTGAACTTCGTGACACCAAACGACGCCCTCGCCGGCCGGCGATAACCTGAG
CGTGAAGATTGATGNCGCCAAGGGTGGCAATTACNAAAAACTGGACATCG
ACGCCACCCCGGCGGACACCACCGTTACCGATNTCCAGGACACTACCGGCCTG
ACCTTGANTCCAACCGATAGCGTTGCTGAANGCGGNTCGATCGTTTACACCG
CAACATTGACCAACGCCNCCGGNTCGCCTGTCNCTGTNACCCTGAACAACNG
NGCCGTGATCAACATCCCTGCGGGNGTTTCCCCCCCCGTNCTANTCTACACGNG
NGAAAAAA

>sad-52 SEQ ID NO: 10

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CCACCAGCAACTTGGCCAGGGAACTCTTGCCCGAGCCGCTGCGGCCAATGATG
CCNATTTTCTCGCCCCGCTTGANCACCAGGTTNATATTCTACACCTNGGGNTT
CTGCTGGTTCGGANAAATNAAANTTCAACTNANNGNATTCCAACGGCCCCT
TCCAGAACTTTCNGGTCANGGGGNGCTCNTCCAAATTGCGCTCTTGGGGCAGC
TCCNTCATCTCGGTCGANAGANATCTTGGTCACCCCCCCCTGTTGGTATCGGGTC
NTCANGCCCNACAACNAAACCAACNGGCTGAGGGCGCGACCGCTGAACATN
TNTCANGCGACCANCCCACCCNTGCTCANGCNACCGGCGATNATCAAGTNTA
CNCCNAAAAANAANATGACCACCCCNGCCAGTTNCTGGATCAACAAAGTGA
TGTTCTTTGCCNGGCCCGGANAACATCTTCACCCCCANTTCTAAGCGGCTGAAG
GTGCCGATAGTCTGTTCCCNCTGGTATTGGCGTNCCNCCCCCCNTACTANTCA
ACNCNTGGNAAAAAAA

Fig. 9

>sad-53 SEQ ID NO: 11

CTGGGTGTATAAGATCAGGGCCANTNGTGTCCTGGAGTGTCTGTNACAGTGG
TTTCGGCANGCTTGCCCTCNANATNCANTTTTTCGTAATTGCCACCCTATGGC
CTNCTCCNAATTTGAANCACNAGNNACCTNCCCANTGNCAAGGGCTTCTTCN
GCNTCNNGAAATTCANCCNACNNNAAATNCGGCCAACCCTGANTGGTTACC
GTCNTGCCGCNCCCNCTCNGCNCATTTCTCTGCCNAACCNTCCCGGTNCCTNGN
TTGCCTTCTAACCCAAGCGNCNGNTNTNNANCNNCCTTGTTTCNCCCCTNCNG
NCCNACGGCTCGAANGGTTTTNCCCCCNTAGGGGCCTCNNTTNTTTCTAAAN
CGCTTTTCCAGAAAAAAGGCCTGCCCGGTNTACNCCTTCTTANNTNTCGTCGCG
TCCNAGNGCTTATCNCTCTCTNNCCCCTTCGGATACTNCTCTGTAAGTTTCCCT
AAAATCNNCTGGNTNGGNTTCTNNCNANAAAGAANATCTNTGGGGGCTTT
NTNTNTTATATCCTCTCNTATTGTNCTTTNCNNTANCNTCTNTCCNNGANNC
TCATTCCCGANACCCTCTNNNNCCCCCTTNCNCTCTCNTATANTTTCTNAGT
TGAACCGCTCNTCCCNCTNCACTNTTATTNNNTNNGCGGGNCGCNCNCTTTGT
CCCTCNTTAACCCTGCGCNTNGCGAGCNTACNGGCTCNCTCCCTAATNCTCTG
GGCGGTNNNGGGGCCNACGTCCTCGCCTTCGTTCNNAAATNNTTCNTAANTT
CCAACNTCCNGCNGCCCCGCTCCGGNNNNNNCAATNTTNTCTCCCCCCTATTCT
NGCTACNCACGCNGTGATNATCCCNTTCTCANNAGCCTNTTCNGGGTATAAC
NGNGNAGNGANNCTCTCTCTTAGTNCCNNAANCCNATCTCTNCTCCTCTTC
TTCNGGTCGCGCTNCTANANCNCTGGTCAGTTNNNTCCTCNATGNNNCNNAG
GNTCCCNNTTNCTCNCTCNCTTCTTGNNNACTCCCNGTNTGTCCNGGANTGGN
TCTTCCGCCTCGGNANCNNTGCTCCTNTNTTCNCNANNCGAANANTCTCCTTN
CTAACACNCCTTCGCCNAANACNTTTTNACTCTNCCCTCNTCCTTCNCTNNCT
CGTCTNATTNTNANTTNCNTNCCTANNCNGTGACTCGTTAGCNCTCCGNTCT
TTCCNANTCTTCGCCCCCNTCTCCNCNCTCNANNCTATCCC

>sad-57 SEQ ID NO: 12

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GGANAAACTCTGCCCGGAGTCGACNCGTGGGTANTAGTCGAAGCGTGGNGAN
GGNTCNCGNTATNAGGCNTAANANCTGCATCACGAAAGCNGGGGGAAGGTT
CTCNAAAAANTTCNCCNATGAGGGAGAACACGGAAANCCCTTTACCNCAGGG
GCGGCCCNGAAATCTGGCAACNGANCGGCNNGGAGAATCNNCCATTTCGTCAG
CTCCATGGGCACCACCGGGAACATCATGGGCGTCNNNTNCCNGTACTANTCG
ACCGTGCCCAA

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Fig. 9

>sad-58 SEQ ID NO: 13

TGACTGTGTGTTATAAGNTCAGNCGCACNTGGNAGTCCNCNTNTGGTTGGTA
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GNCAATCANNCNNTATTCACTCNCCCGGCGTNCACNCCTNNGTANTANTCG
ACCCNTCGNCANTANTNTACANNTGGTCAAAACNTTTCGANNNNGTA
GGNGNCCCCCTNTNTANANGTNANCTTCGTNACGGGGGAGGAAAANGCTCC
CCGGNGGCCANNNCCCGAGCCTAAAAAAANGAGGCANGTANGGGTGNGAAA
AAANAATANCTNGATANGACNCCACCCNNTTTGACGCCAATTAACCGANG
TACANGACCCNGNCNAACTCATTTTNAGTGTNCGCGACAGAAATTTTNANG
GNCGCNCCANGNGAANCGNTCTCNANGGTTTNGNAAANNNAAACNAGCCC
CTCCNNTAAATGGTGGACCCGCGGNNAANNTTNNCCNCGANTGGGGTTTTGA
AATTACTTTTCAACAATCTTCAAAACNTCCGGGTCNANCCAGGAGGGGNCA
AAAAAAAAAAATNTTTCCGNGTNGCCNNAAAAATATCCNAAATTTTNTCN
CCCCCCCCCCNCCNNAAAGAAGGGNGGGGGGGAAGGCGAAAAACGGGGGA
ANGAGGGGGGGGAACGGGGGG

>sad-62 SEQ ID NO: 14

GTGCTTGTGTATAAGNTCAGNCCCTGGCCTGNGCCNCNACAACTCCGGTNNCC
GTCTACANTTTAGCNAAGGATCGGTCATTGCCTNGTCTNCTGGNTANACTNC
CGGCACNATCCACCTCAATACTCCNNCCATTNACGTCTATGGTAACCNGGAG
GTCGGTCANCAGNNCNATTACCGGTNCTACCNGTGGAAACTTCGAAAATCT
NGTGGCNAACACCGGACCTGCGGTCCCCNCCANTTCCGATTCNCGGNGANACN
NCATGGNTGTCNCNNACNGGNNGCNACNCCATTCCTGNANGGGNGCCAANTT
CCTTTCNCNTCAANCCGTNGGNAACGGGCCCNAATNCCGTNAACGTTACCNN
NGANAAATGGTCNGTTTTCCATTCCCCCGGGGGNANAAACCGGGACNGAAG
ATTTCAANACCCCGCCNTNTNATTNTACCNNGGGGNNNGCGGGTCGNCCCCC
NCNNNACNNGTGANAANGGGGGGCTNTTCAAANTTCNTNGTGTTNANCAC
NACCCTGGCGTTTNATANTANTTNCANAATTNCGGGNGGAANACCACCGGG
GCTTNANNNCTTNNAACNGGNCNNNCNACCNNCTTTCCNNNNNGGGGGGGN
GTTCCNNCNNCCCCCCNTTNNNTTNNTTTNNAAANNTTTTTGGGGGAAAAA
AA

>sad-79 SEQ ID NO: 15

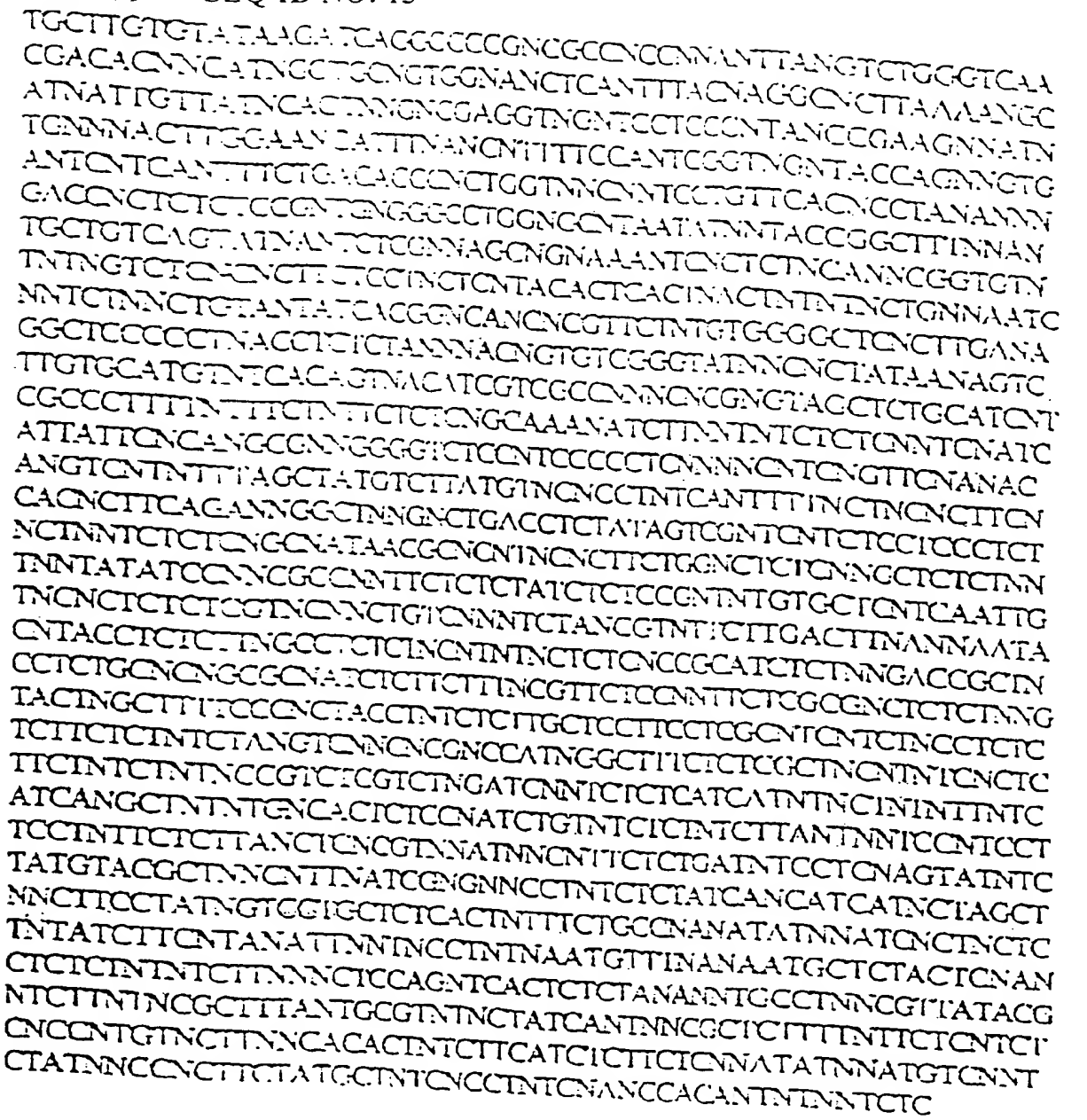

Fig. 9

>sad-80 SEQ ID NO: 16

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TTGTNCNNCCGNAGTTCCAGCTTCNGCCTCGCCNACGTNNACAATTCCTNCNA
AACCCTGCGGTGTCNTNTTCCNNAGCTNATGTANGANNGTCNATNGGNCTG
NNNGNACTGTCNTACCNAGNCNCANGTNGGCACCAACCNGAGCNTCATTCNC
GCNNACNNCGAACCCGNGNGNATCGCTTCTNTCCNAACNCCNNCAANTCCA
ACNCCATNGGTTGTGTTGNCNACGACNNGNGCGAAAACNNCGCNCACNNNG
NCCNAGTCAAGTTCCCGCATACCCACAGCNGGTCNGGGGGTNTCNCCCCCTNT
CNTGTTCCAAACATNNCCATANAANNNNNGGTNTGCTGGGGCAATCCAAN
CCNTCNNCTCNGGTTCGATCNAAACAANATANGGGTCAANGGNCNGCCACT
TGCNTNATNAATTTCNNCAGTGCCCNTNNCTCNCTGATNNGCNAAGCCNNC
NNNGGGTTGCNGGGCGNNNTTNCCCNNNTATNAANTANAAACGGCNGNTCC
NTTNNCNNCCANGGGTGNTTGNNGNTTTNNAAAACNNCTTTTNNNNAAAN
ANCCCCCCNCCTNTTTNCCNNGGANNANNATCCNNAAANNNNGTTCCNNCCC
C

>sad-81 SEQ ID NO: 17

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TCTGGGTCGNGCTACACNNCANNGGNNACTGGCAGCTCGGTNACCGCTACCTN
ANAACGCTTCANTGTTCCTCAGCNGGTCCACGTCCAGCCTTGAGCCACATGTN
AAAANNCNGCCNACAANCCNNGGNGTNAANNTCCACGNNNTGCNCGACGA
NTGCCAATNNAANNTTCTCNACNGTTTCACCTGGAANGACCTTGCCGANAC
CNANACNNTCACCAANGGTGAANNCAACTCCCGGNAGATNCGCTNCACNCC
NGACCCCAACGAATCCTNCGCCGNNGGTTTTNTTAGCANCATCGNCGNCANC
AACCANGNCCANTTCNCCCCGNTNTCATTCGNNCCNANCGACGGNNNNTCTG
GGCGTCNCCCCCCCCGTACTANTCTACNCNTNNCAAAAA

>sad-89 SEQ ID NO: 20

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TNCTAATTGATGCTTGCCAACGNTTNAAAAAAAAGTATNGACAGGGTNTT
AACCATCAGNTTNTNCCNAAANGTACTAGTCTACCCGTGGCCANANAANT
NNANNNNTGGNCA

>sad-83 SEQ ID NO: 18 19/34

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TTCTGCGACCGCGNNNCCGACGNCTGNAATCGNTGGCNAGGTNNGCNTANAC
ANNNNAAAGTANNCCCCTCGAANCGNTCNNTGACCTCCTGNTCCAAATNGT
CACGNGCATTCGNCGACGCNNGCNCACCCNNCACTTCGCTCGACNTCCCAAAA
NCNGCCTGGGCCNNCGNCGNCNGGATTNNGCCCGACATCNNCTNANCAAANT
NCCCCNCCGCNTACTNGNCCANCCTTGACCANNTTTTGCNCTCCTNTCCTTACT
CGGTCNGCTTCGNTCCCGGNTTGCTNACCANNATGGTCCNAANCCTGCTGTCC
TNCACTCTCAAATNCGCCCCCGGCCAACGNTGCTGATCGNCTTCNNGNCCCNA
GTNCTATTCAACCCCTGCCCAAA

>sad-87 SEQ ID NO: 19

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ATGGACAGCCGGCTTTCCGGCCGTCGAGCAACGATCTGTCCACAGTNNANCAC
CANNAGGCGNTCCACCATCAANAGAAAGGANNCNCGGTNCNTNACCACNN
ACACANGTCTTGTTATCNACCACGGCAGCCAAGCGNTGTTTCAAACGTTCTT
CAGCNGTGTTGTCCATGGATCTGGTTGGTTCGTCCAANAACAAGATAGCCGT
GTTNANCNCCNTNCNACTNGACACGTGGAAATTNTNGCTCTAACCNCCCGAC
ANGTTCTGTCNNCNCTCNCCNAATNNNAATTCATAACCTTNCNGATGCCNGC
GGGCAAATTCATNCNCNCCCGCCANTTCACGGNCTGGAACACANTTCAACTN
CNACGTTTCNGGCGCCNAAAANTCTTGTTGTCNCCCAGGNTTTNNNNANCAN
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>sad-98 SEQ ID NO: 21

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Fig. 9

>sad-100 SEQ ID NO: 22

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GTCATGCCACCTCCNCTGACACAACGGTGTNCTCAATAGTCANCACNCCCT
NNCCCCCNGGGAGGANATNTNTCNCTGGNNCCACNCNANCANCATCTTTAAC
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NTGCAGCGACAACCCCCGAGAAANCNATTNCTTGGNNGGCTCNTCNATC
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CCTTNCCAGNCCAA

>sad-101 SEQ ID NO: 23

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TANCNTTCTCCGATACACTTNTCTTCTTCCAATATCCCCCGCTAATCCCCTCTC
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>sad-102 SEQ ID NO: 24

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AATGGCAGTTCCTGCCGTGGAANCGCTGCCTGGTGATGCTGGANCAGGGGTTG
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TTTACCCCNNCNAANGNCTNTCNGACNTGGAATTTGTGATNTTCTACNCCNA
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NNTANTCNACCNTGGNNAANAA

Fig. 9 PAGE 12 OF 12

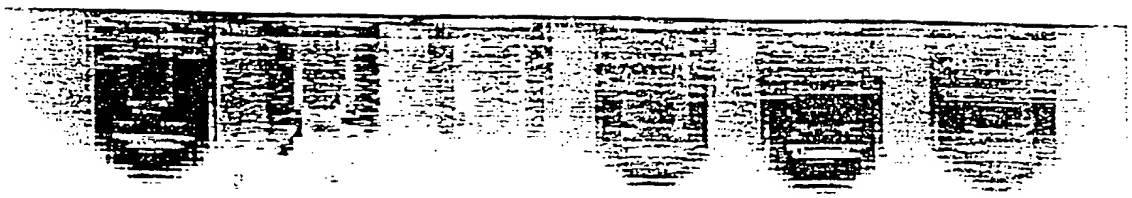
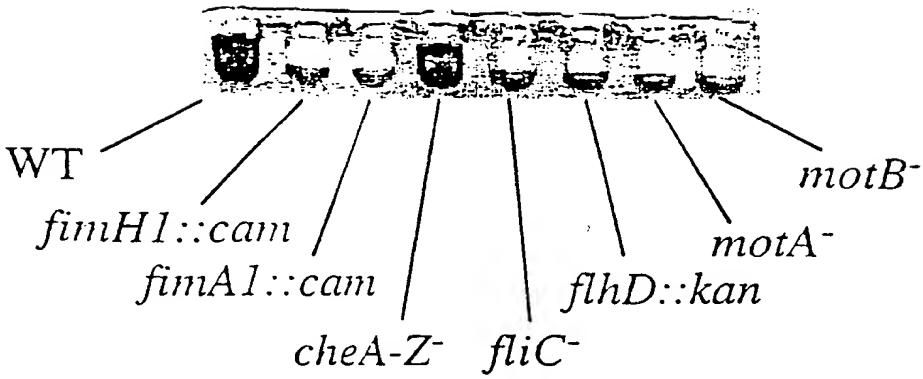

LB
glycerol minimal
glucose minimal
glycerol minimal & CAA
glucose minimal & CAA
minimal & CAA

Fig. 10



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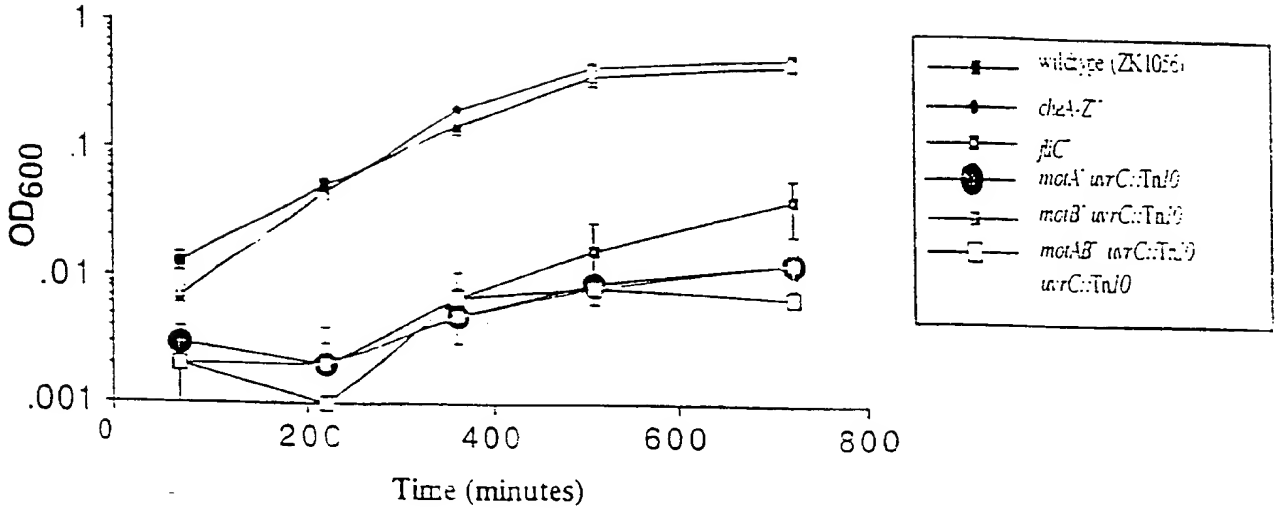


WT *cheA-Z⁻ fliC⁻ motA⁻ motB⁻ motAB⁻*

Fig. 12

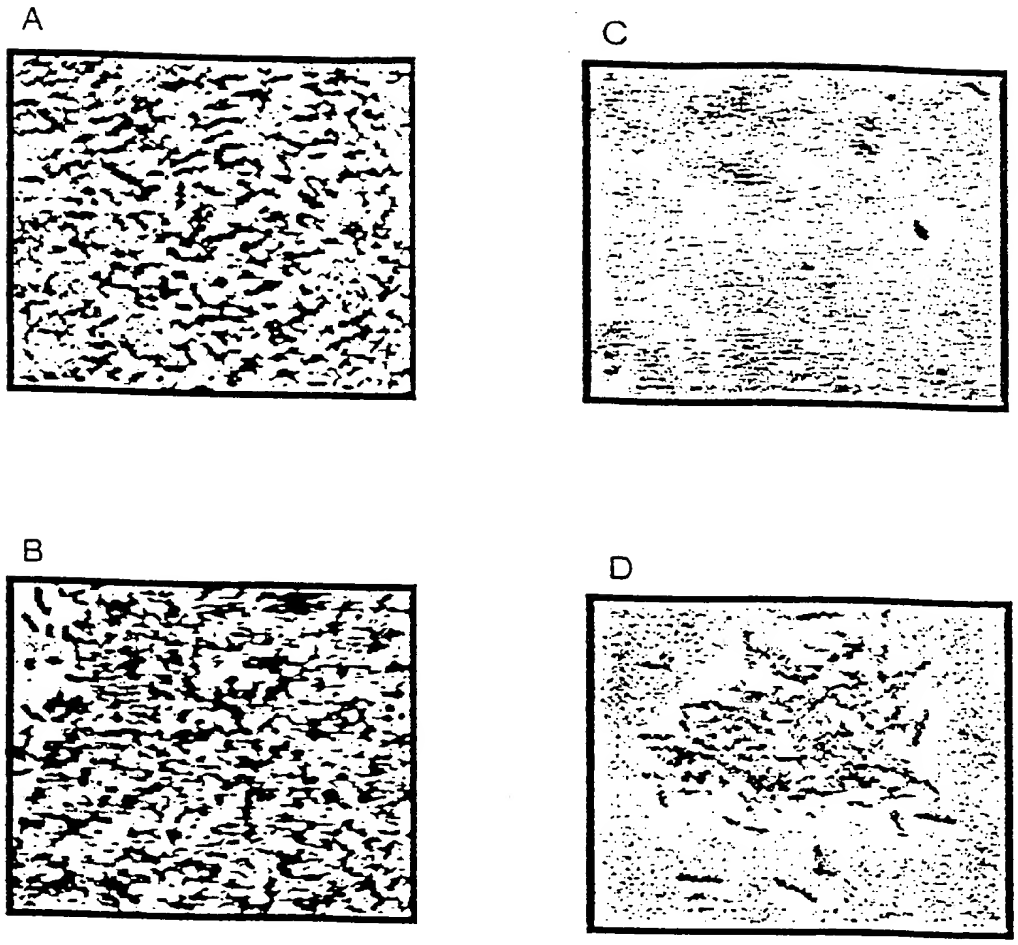


Fig. 13

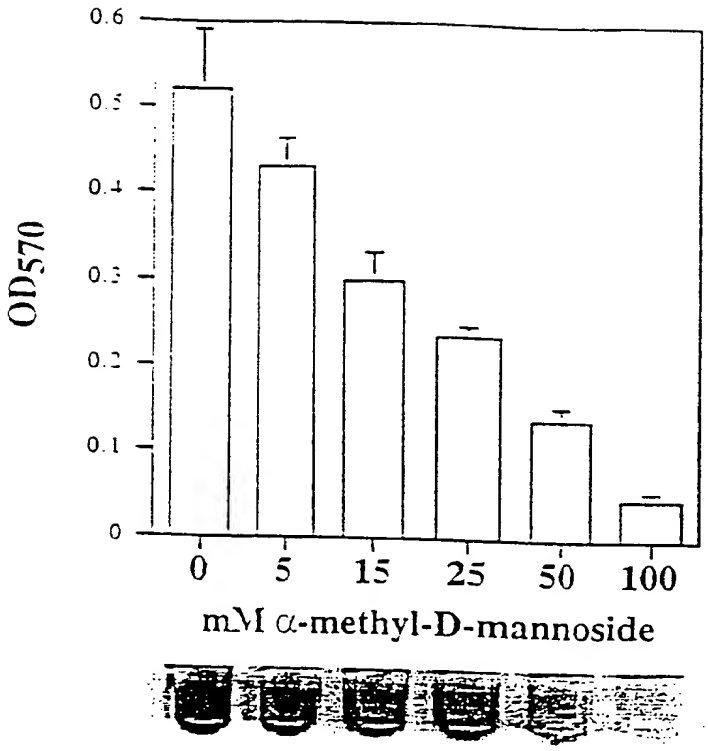
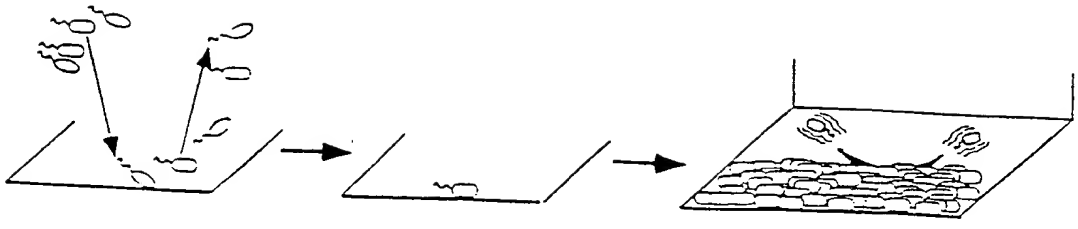


Fig. 14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motility required
attachment
type I pili required
biofilm expansion
motility required

Fig. 15

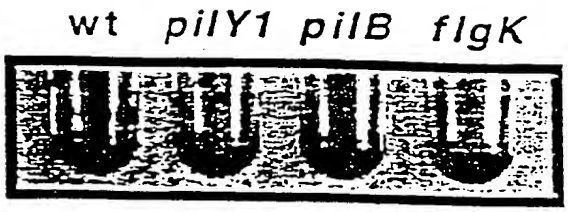

Fig. 16

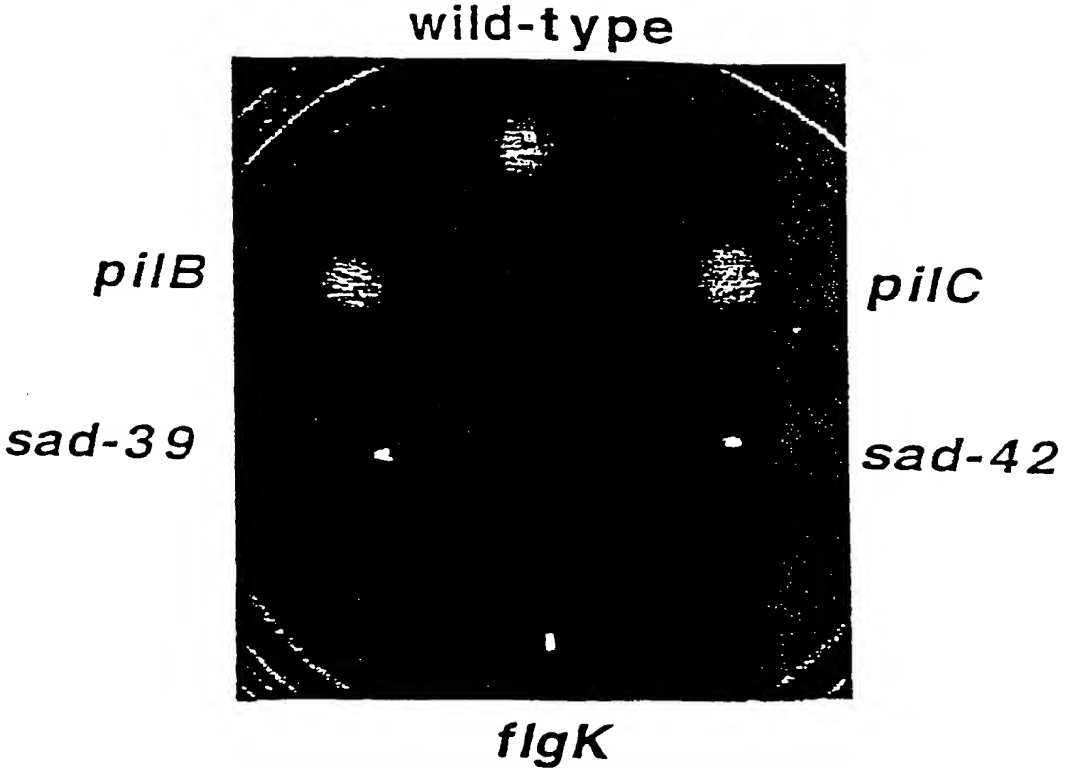

Fig. 17

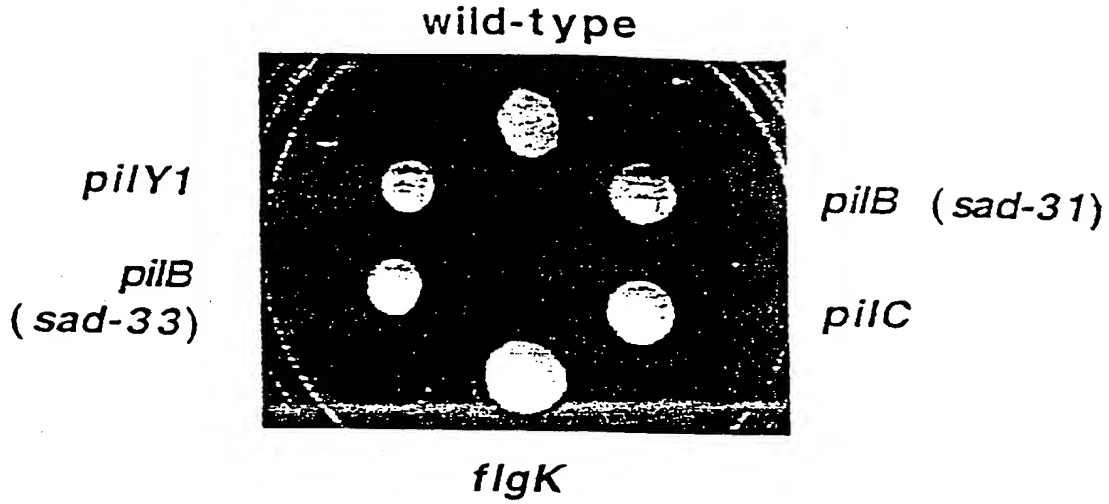

Fig. 18

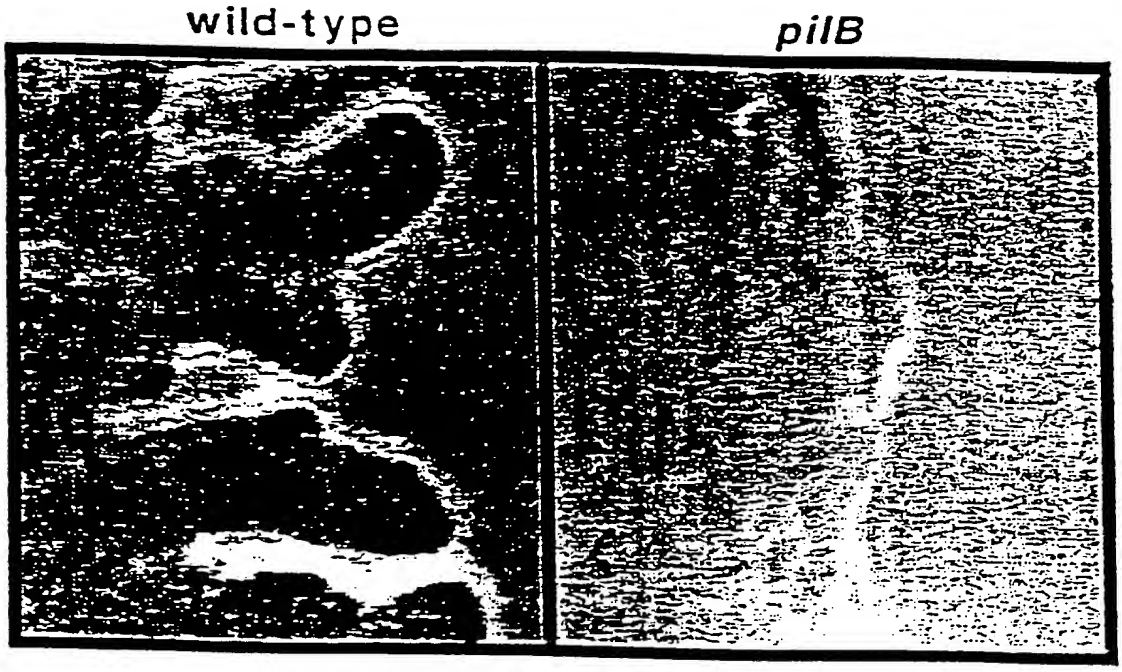

Fig.19

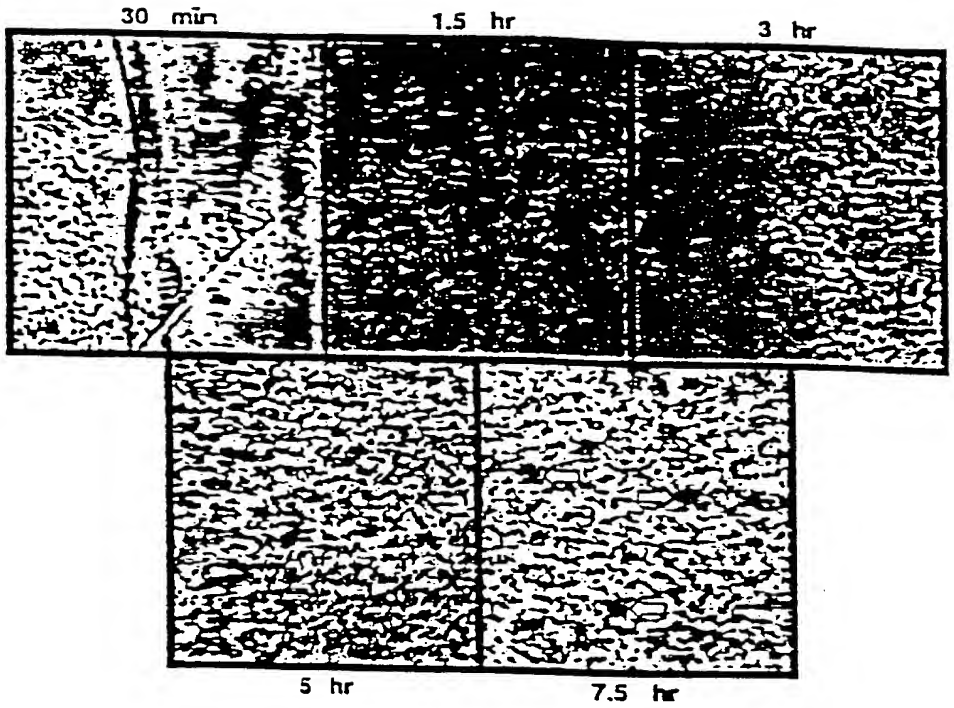

Fig. 20

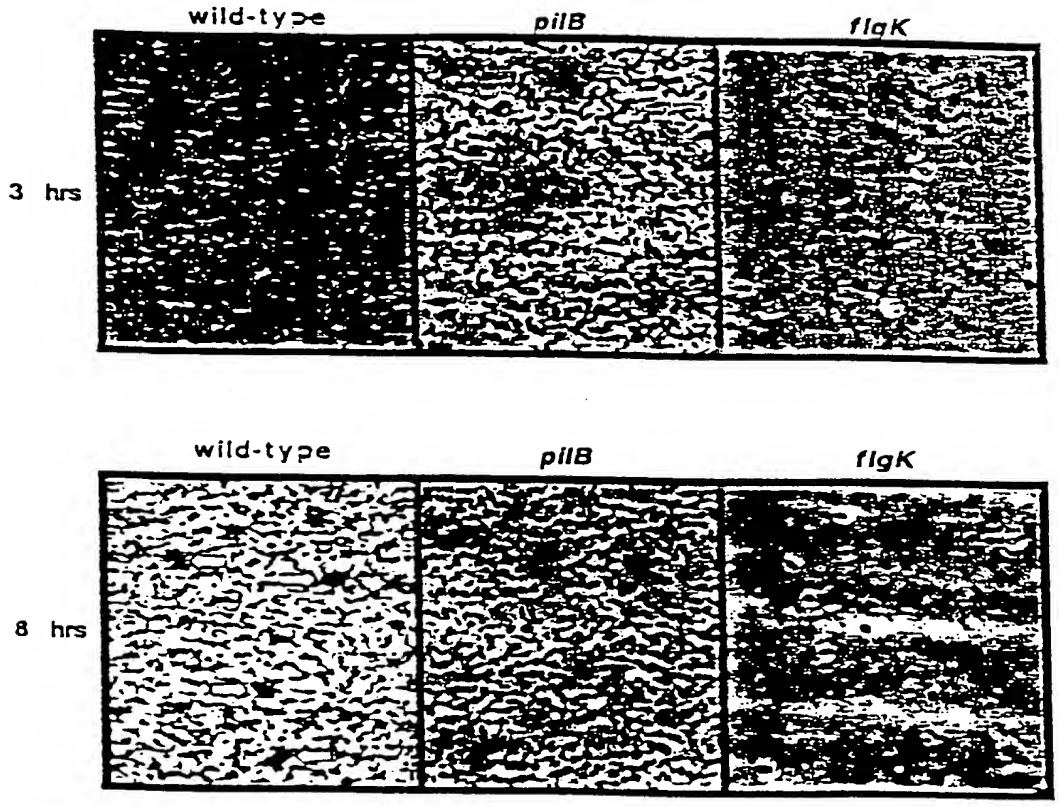

Fig. 21

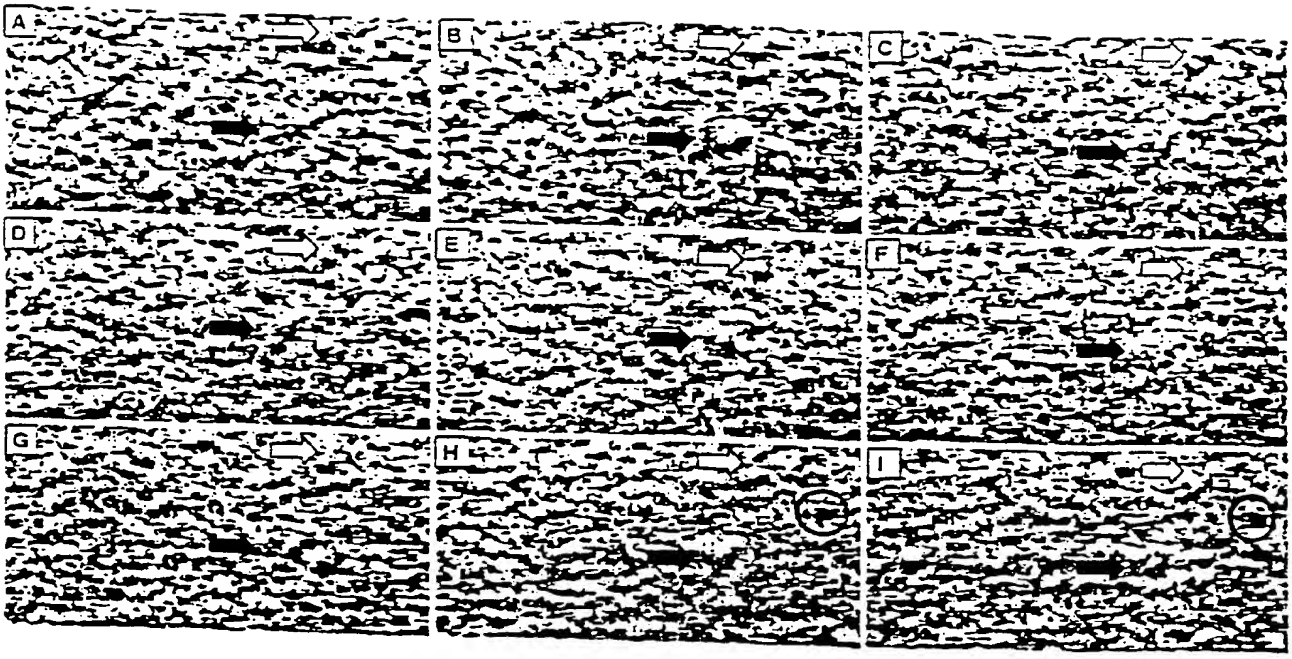

Fig. 22

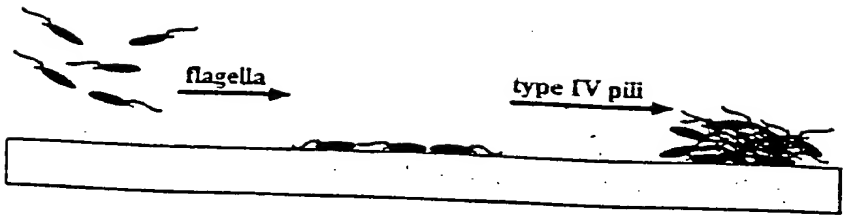

Fig. 23